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HELICOPTER FLYING QUALITIES CHARACTERISTICS-CH-46E  
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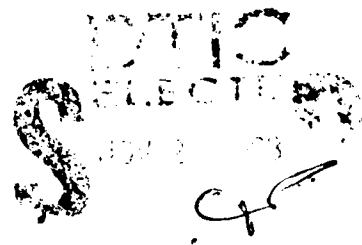


## HELICOPTER FLYING QUALITIES CHARACTERISTICS-CH-46E VOLUME 2

BOEING VERTOL CO.  
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3 OCTOBER 1983

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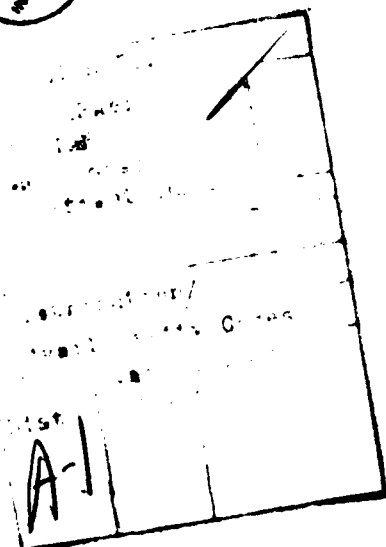
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  This document defines the flying qualities characteristics of the CH-46E helicopter. The data are representative of both the metal-bladed and composite-bladed versions. Analytically computed static trim data are presented for a wide range of configurations (gross weight, c.g.) and flight conditions (airspeed, altitude, sideslip, climb, autorotation). Correlation of trim data with available flight test data is provided for validation. (see next page)		

## 20. ABSTRACT (continued)

Analytically computed static stability and control derivatives are compiled for significant combinations of configuration and flight condition. Time history data relating to dynamic stability, control response and SAS failures are extracted from flight test records obtained during the Contractor's CH-46E SLEP II flight test program.



VOLUME 2

CH-46E TRIM CHARACTERISTICS

→ This Volume contains plotted trim data obtained from the Boeing Vertol Tandem Rotor Trim and Stability Analysis Program (A-97) for the CH-46E helicopter.

A catalog of the flight conditions at which the trim characteristics were determined is given on Page 2. Data for the following flight regimes are presented.

→ Level flight, from 40 knots rearward to envelope-limited maximum forward speed, at sea level and at service ceiling for the two gross weights considered.

→ Maximum power climb and autorotation, from 60 knots to 120 knots at sea level, and from 70 knots to envelope-limited maximum speed at service ceiling, for two gross weights.

→ Constant altitude sideslips, at sea level, to  $\pm 45$  deg at 50 knots,  $\pm 30$  deg at intermediate speed, and to power-limited sideslip angle at high speed, for two gross weights.

→ Sideward flight, to 45 knots left and right at sea level, for two gross weights.

→ For each flight regime considered, the four cockpit control positions, plus helicopter pitch and roll attitudes, are plotted vs. airspeed or sideslip angle.

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CATALOG OF TRIM FLIGHT CONDITIONS  
A97 TRIM ANALYSIS FOR CH-46E

- Figure 1 Level Flight Page 3  
24300 lb., 6 in. fwd, 0 ft.  
24300 lb., 13 in. fwd, 0 ft.  
24300 lb., 6 in. fwd, 8000 ft.
- Figure 2 Level Flight Page 6  
17500 lb., 20 in. aft, 0 ft.  
17500 lb., 40 in. fwd, 0 ft.  
17500 lb., 20 in. aft, 14000 ft.
- Figure 3 Max. Power Climb and Autorotation Page 9  
24300 lb., 6 in. fwd, 0 ft.  
24300 lb., 6 in. fwd, 8000 ft.
- Figure 4 Max. Power Climb and Autorotation Page 12  
17500 lb., 20 in. aft, 0 ft.  
17500 lb., 20 in. aft, 14000 ft.
- Figure 5 Sideslip Page 15  
24300 lb., 6 in. fwd, 0 ft., 50 kt  
24300 lb., 6 in. fwd, 0 ft., 90 kt  
24300 lb., 6 in. fwd, 0 ft., 130 kt
- Figure 6 Sideslip Page 18  
17500 lb., 20 in. aft, 0 ft., 50 kt  
17500 lb., 20 in. aft, 0 ft., 95 kt  
17500 lb., 20 in. aft, 0 ft., 140 kt
- Figure 7 Sideward Flight Page 21  
24300 lb., 6 in. fwd, 0 ft.  
17500 lb., 20 in. aft, 0 ft.

# CH-46E TRIM CHARACTERISTICS LEVEL FLIGHT

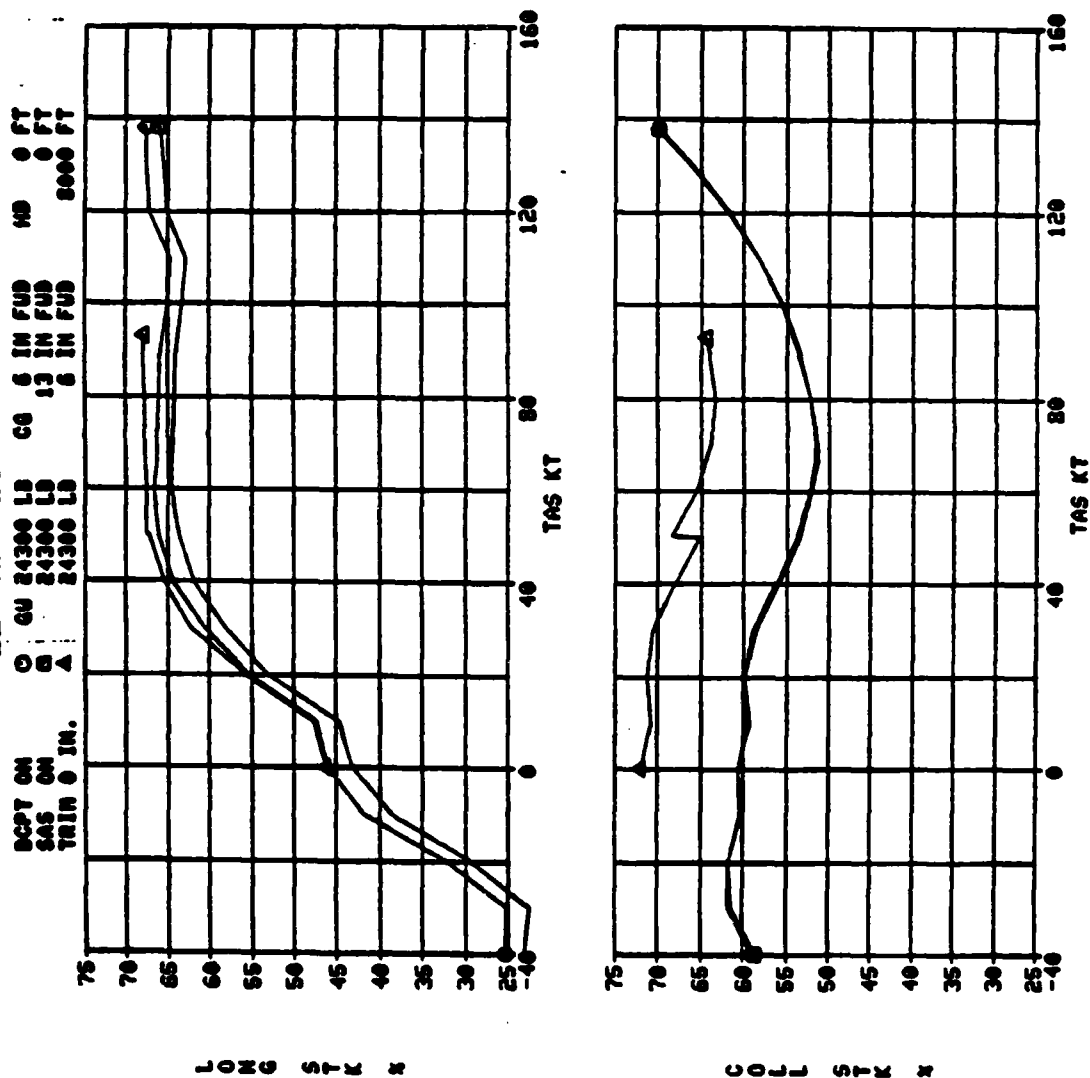


FIGURE 1A



# CH-46E TRIM CHARACTERISTICS LEVEL FLIGHT

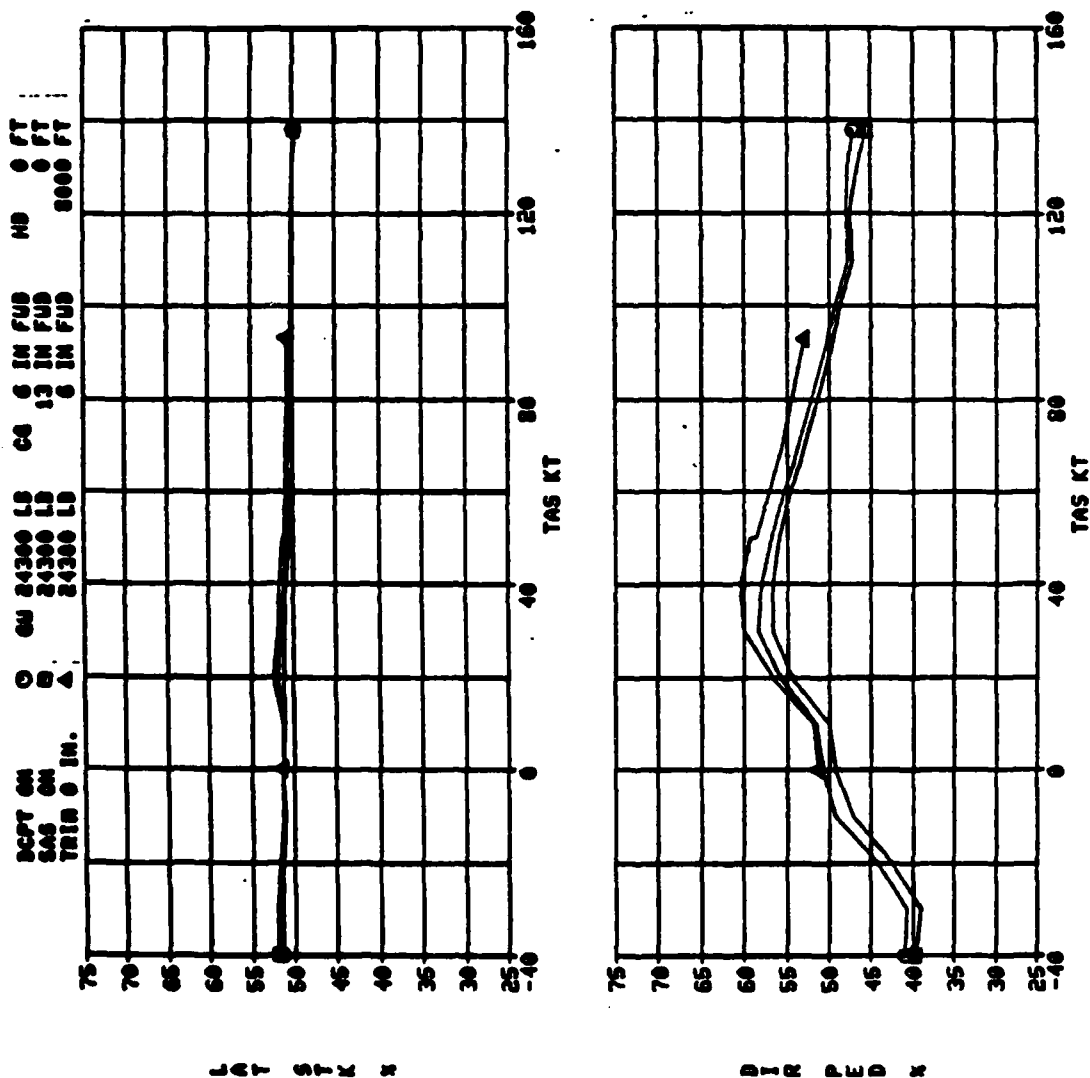


FIGURE 1B

# CH-46E TRIM CHARACTERISTICS LEVEL FLIGHT

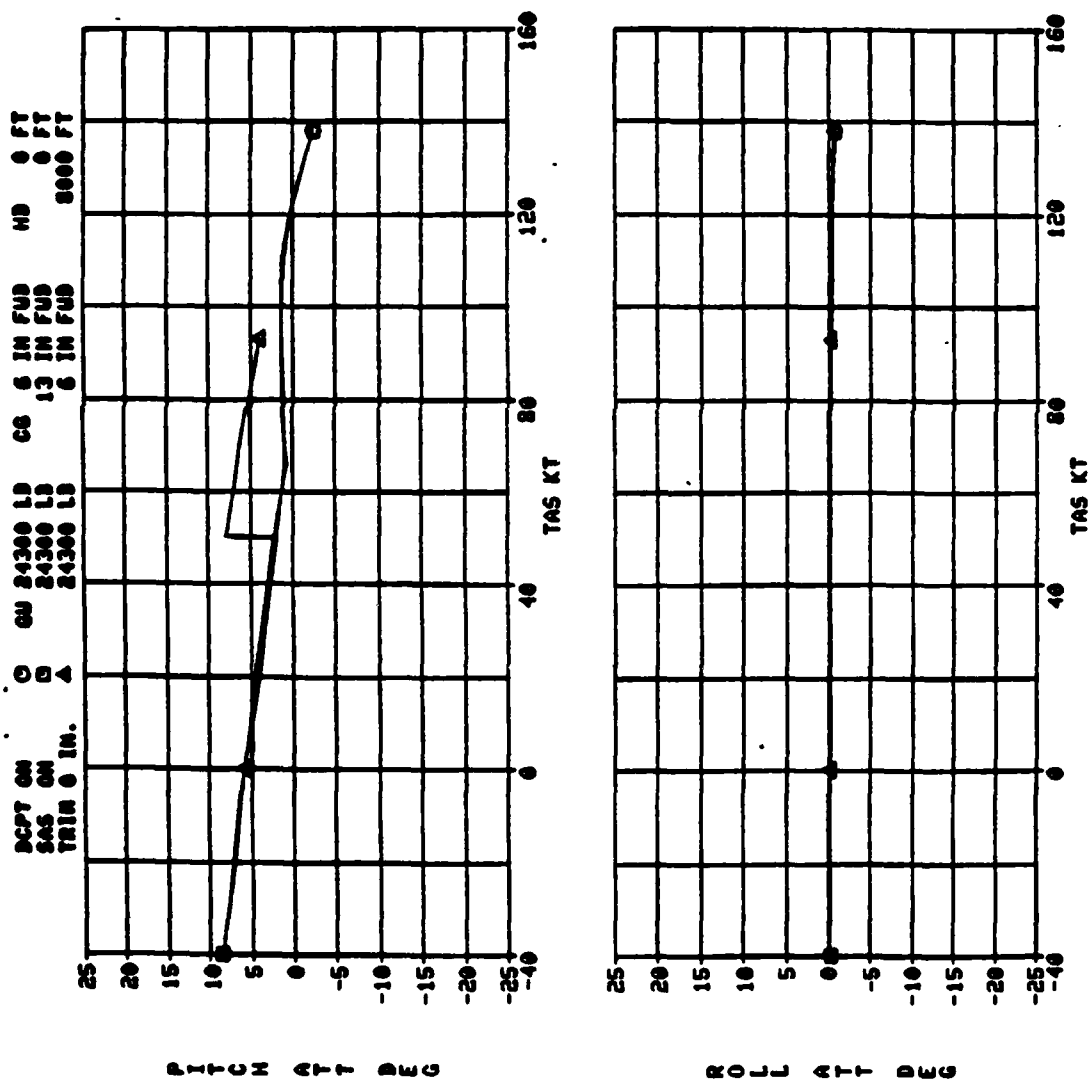


FIGURE 1C

# CH-46E TRIM CHARACTERISTICS LEVEL FLIGHT

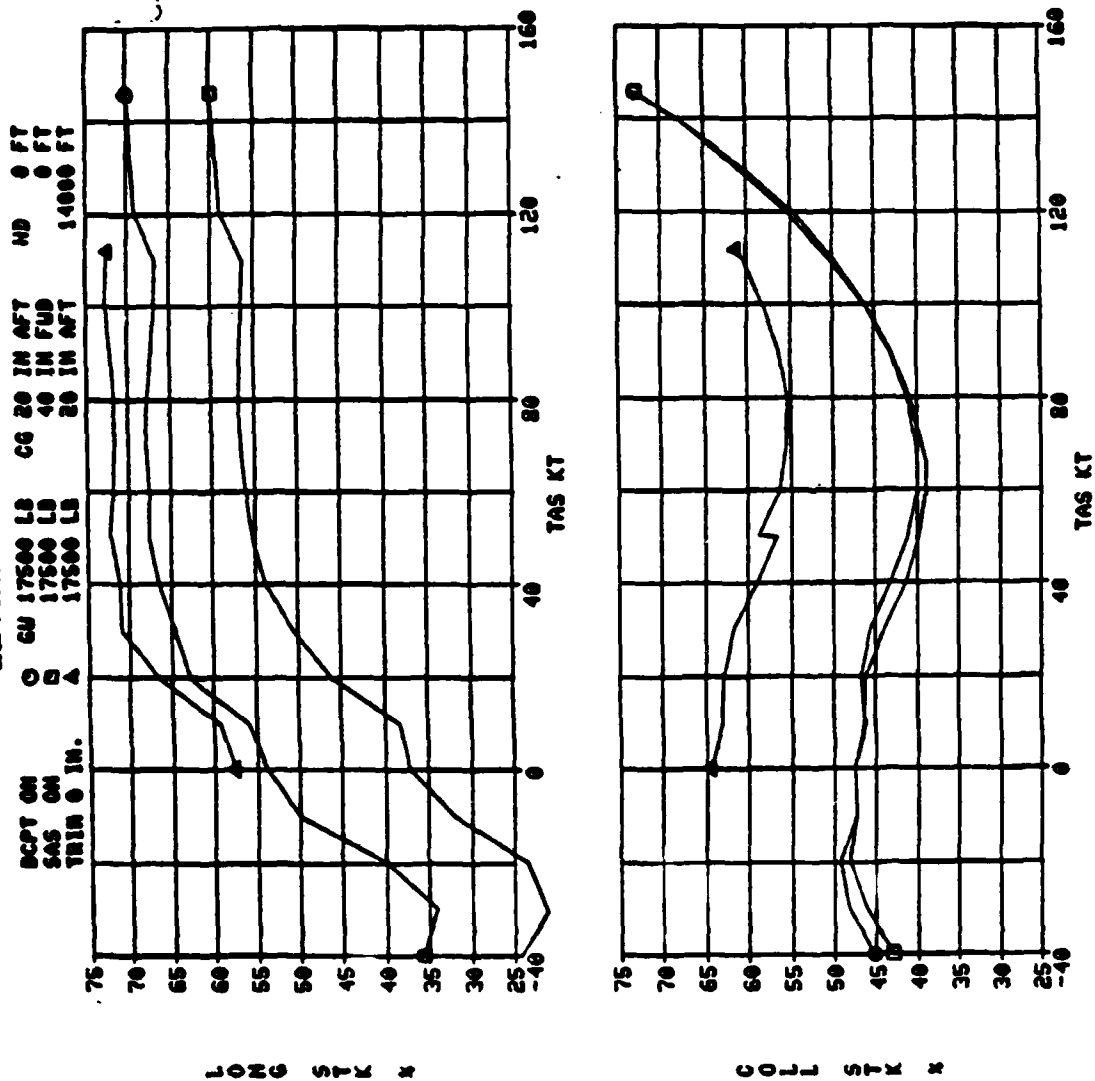


FIGURE 2A

# CH-46E TRIM CHARACTERISTICS LEVEL FLIGHT

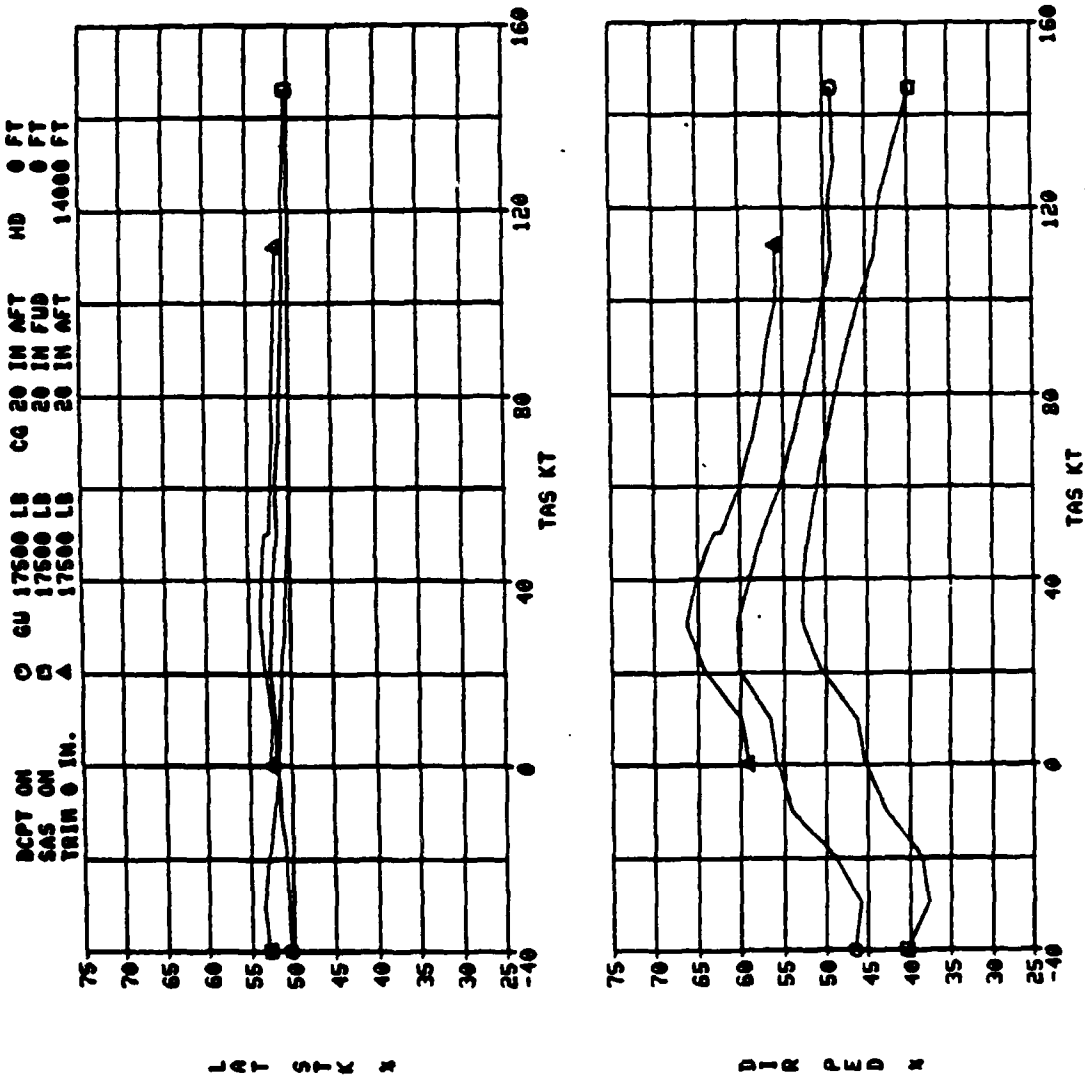


FIGURE 2B

# CH-46E TRIM CHARACTERISTICS LEVEL FLIGHT

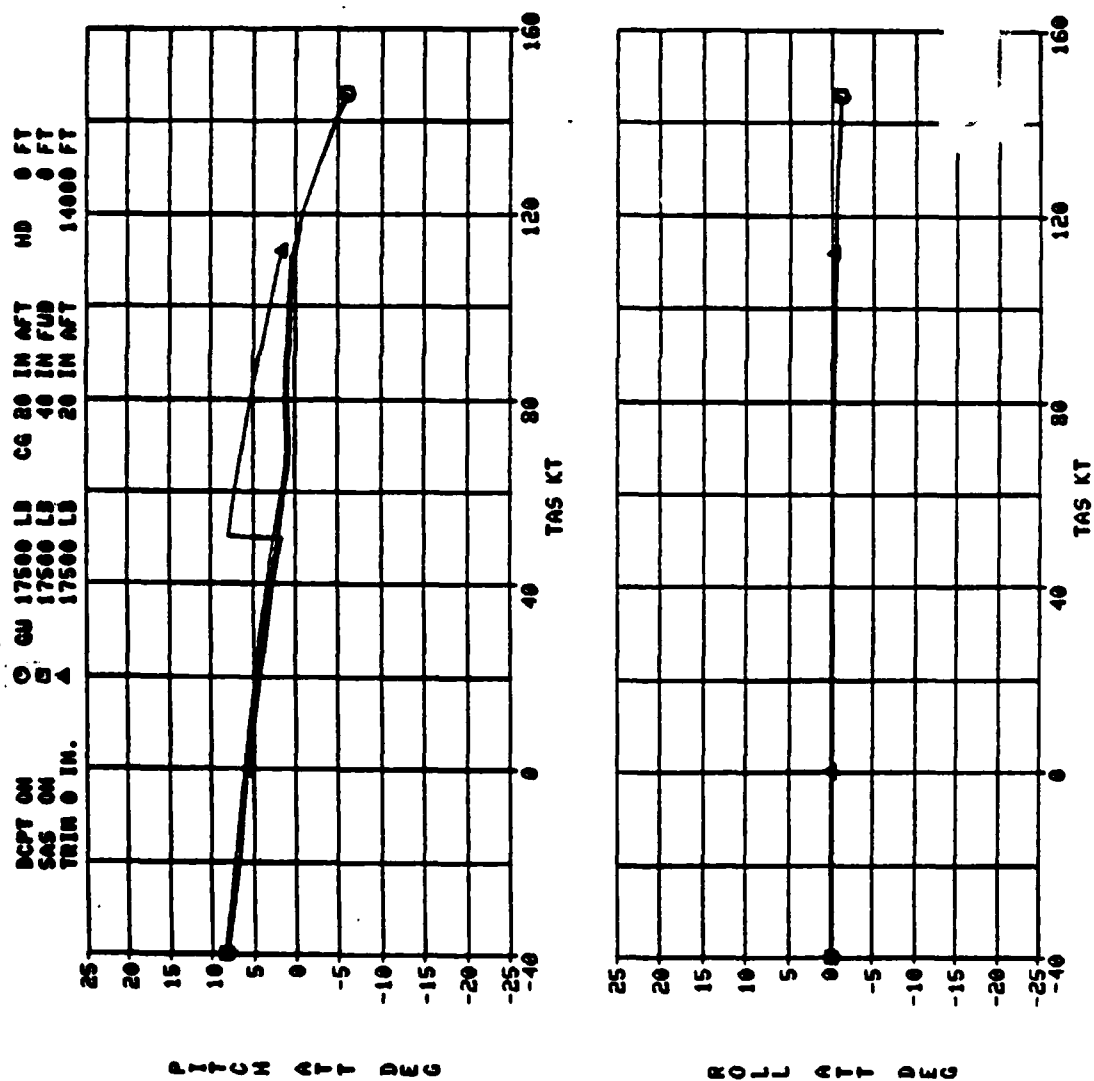


FIGURE 2C

# CH-46E TRIM CHARACTERISTICS MAX POWER CLIMB & AUTOROTATION

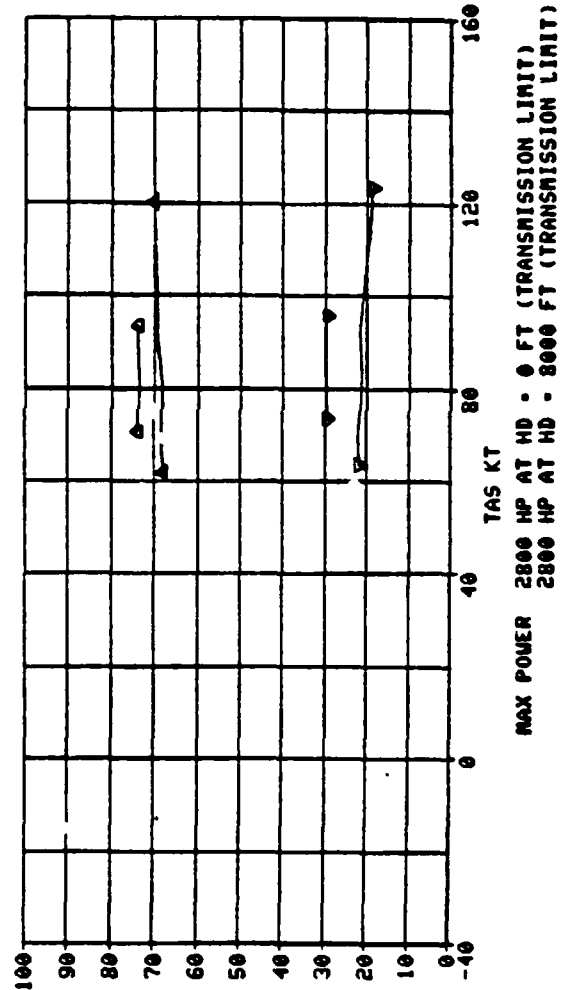
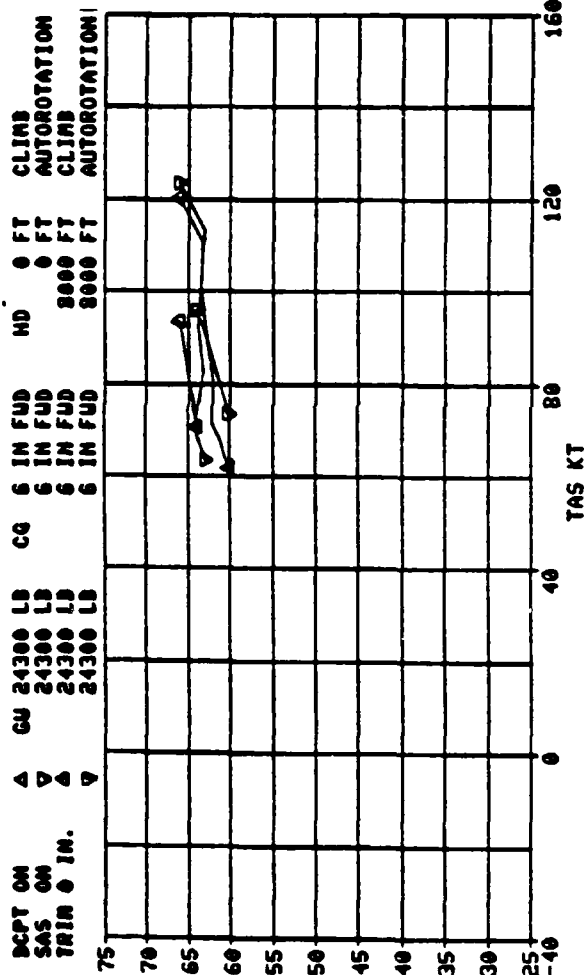


FIGURE 3A

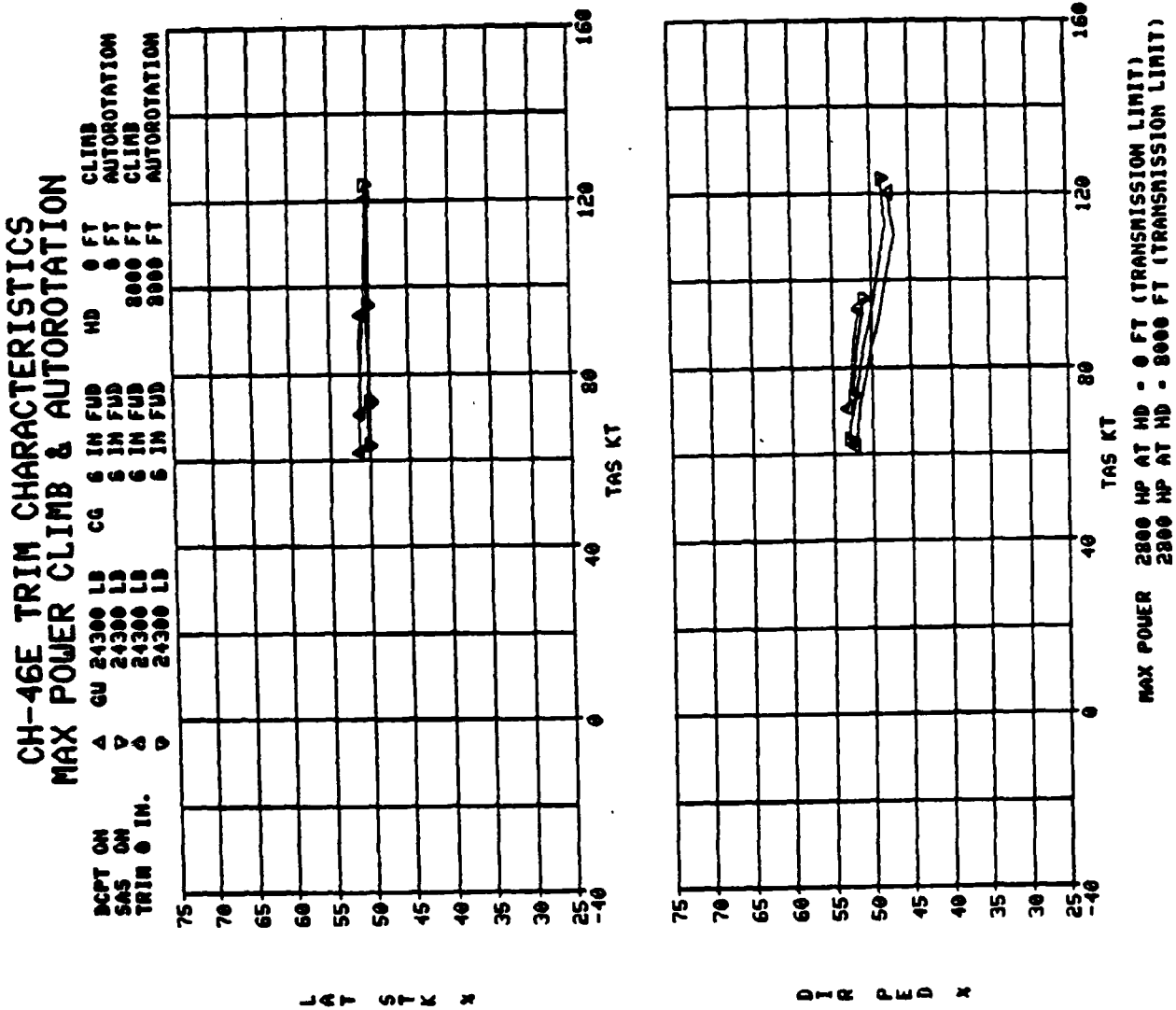


FIGURE 3B

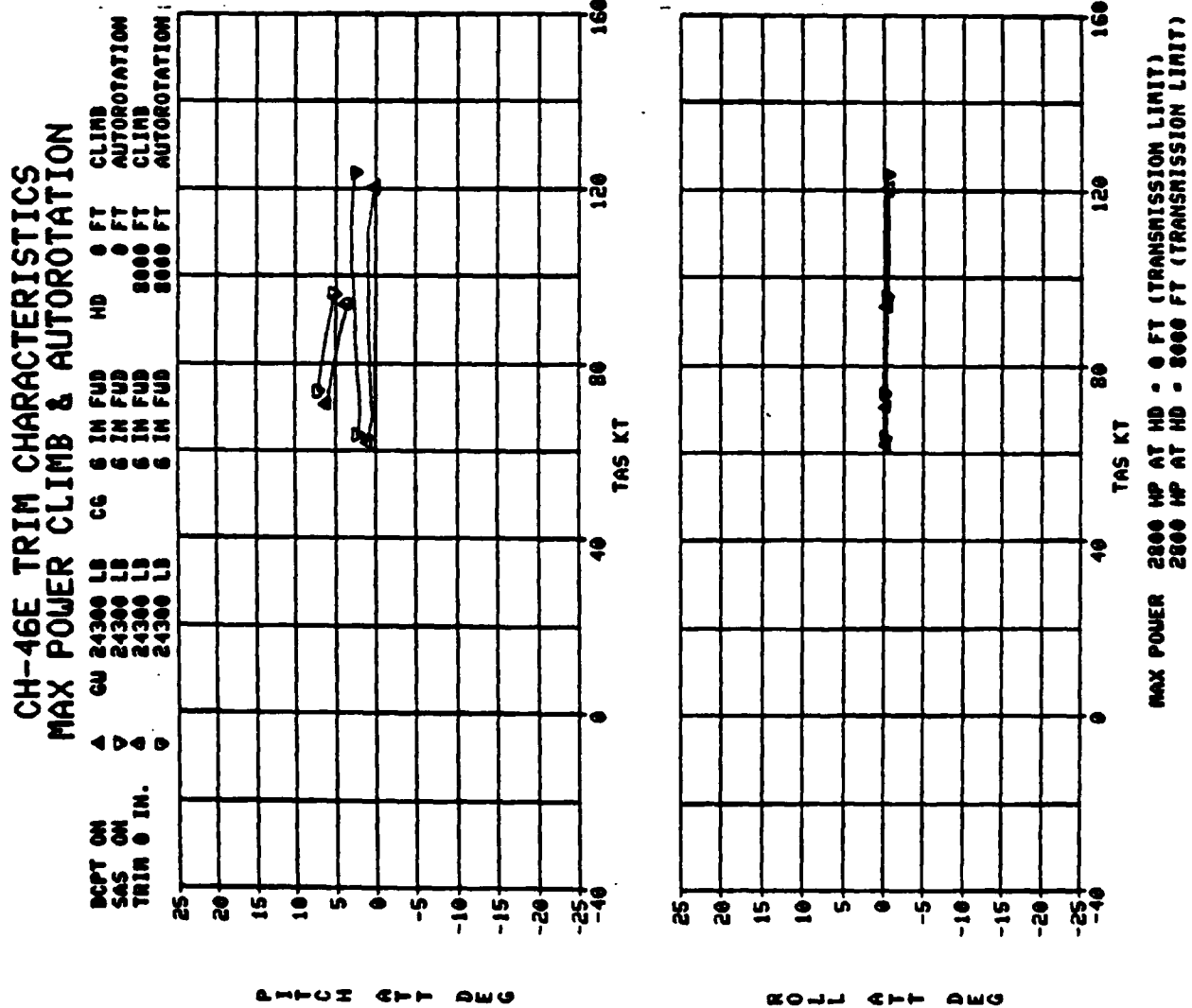
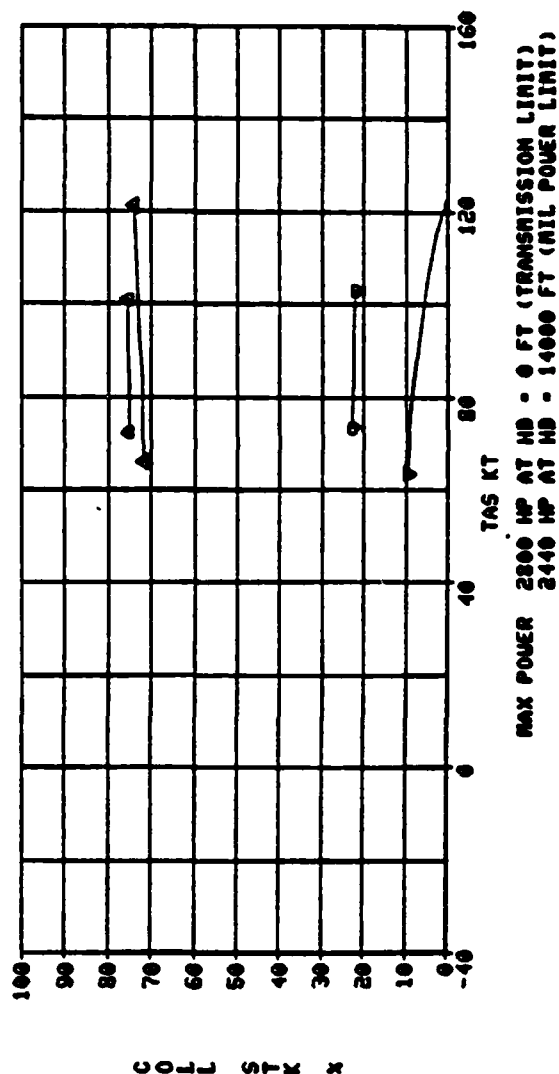
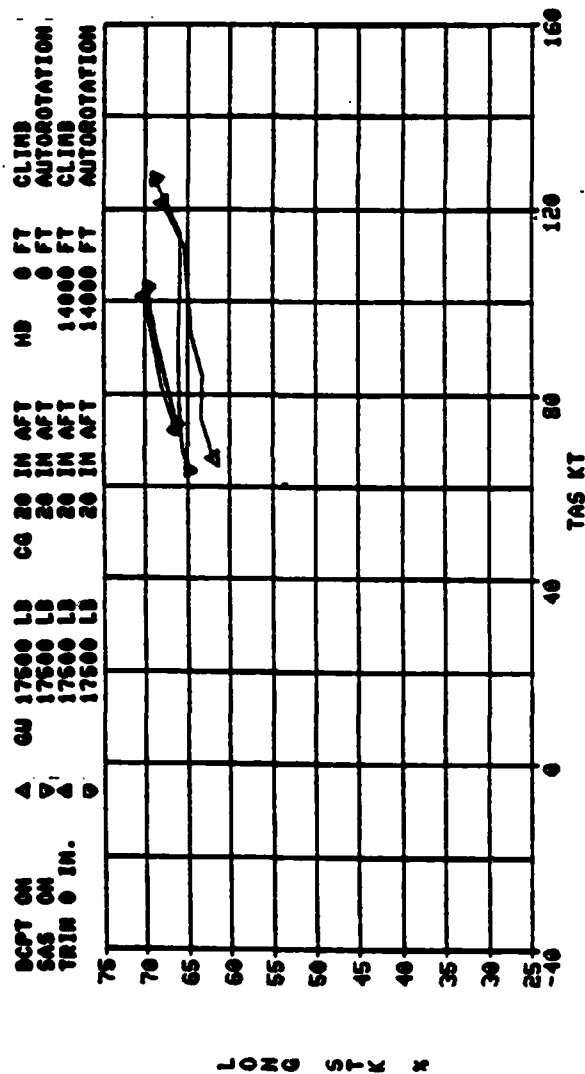


FIGURE 3C



## CH-46E TRIM CHARACTERISTICS MAX POWER CLIMB & AUTOROTATION



**FIGURE 4A**

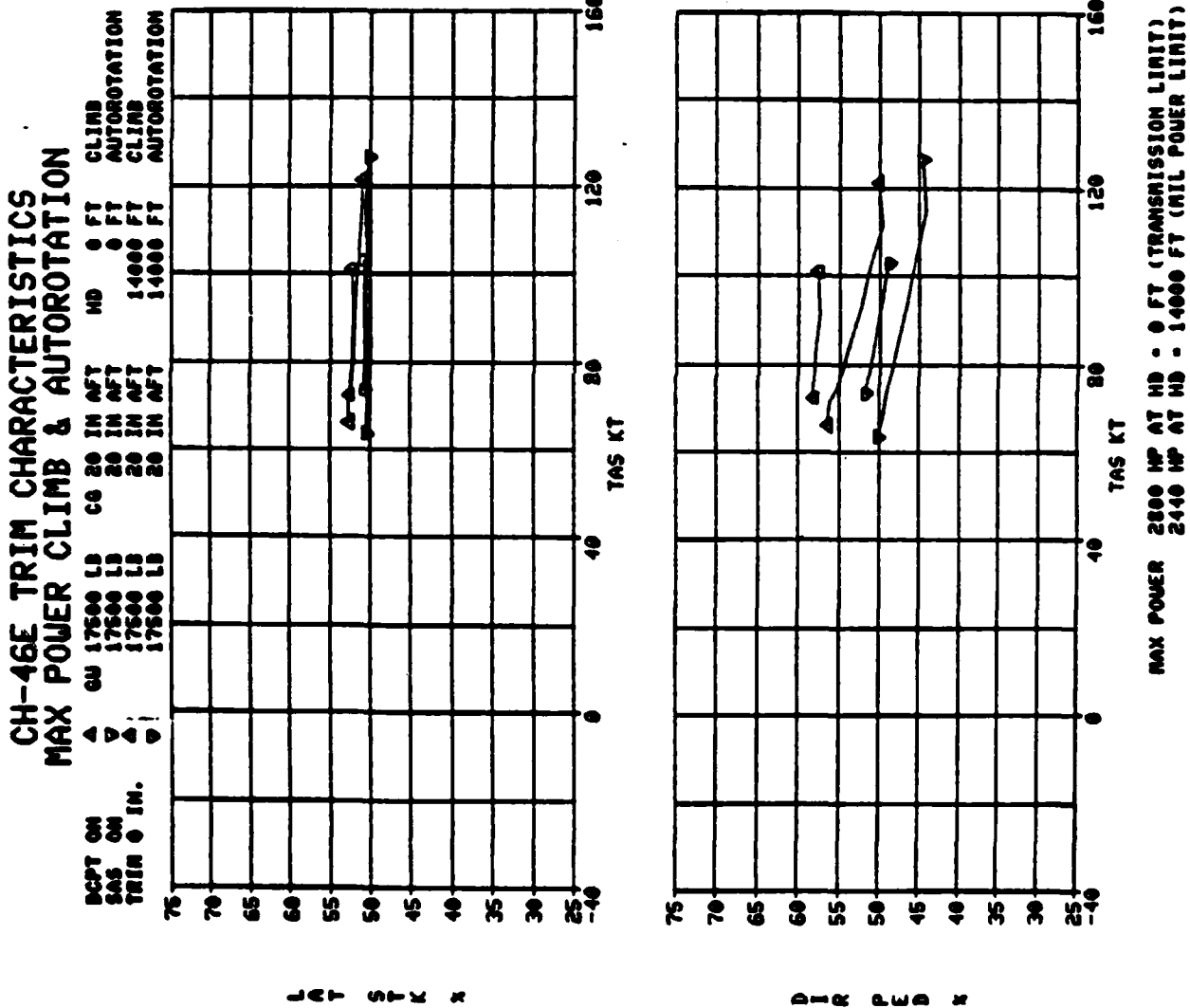


FIGURE 48

# CH-46E TRIM CHARACTERISTICS MAX POWER CLIMB & AUTOROTATION

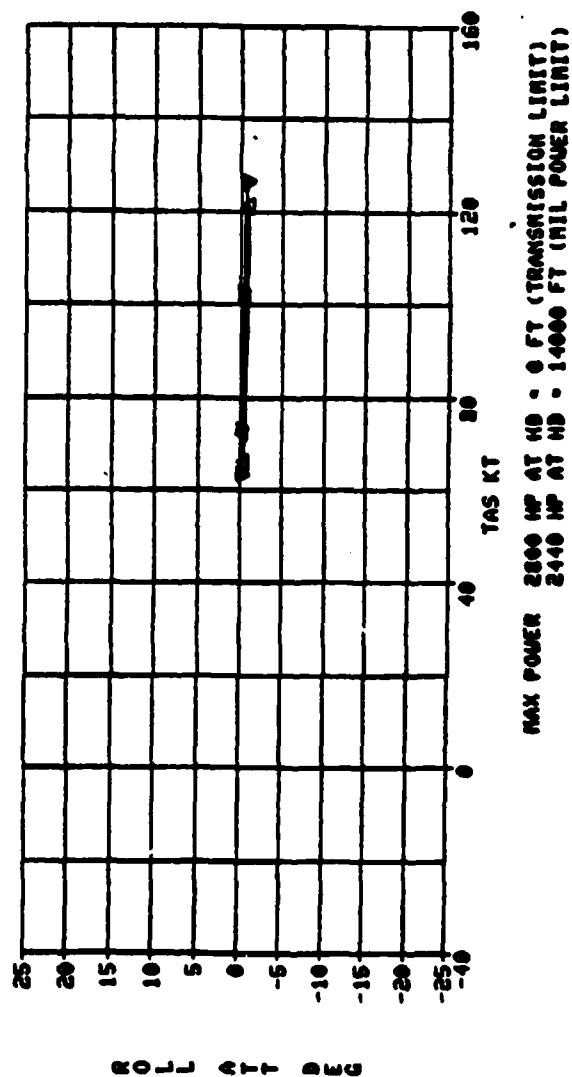
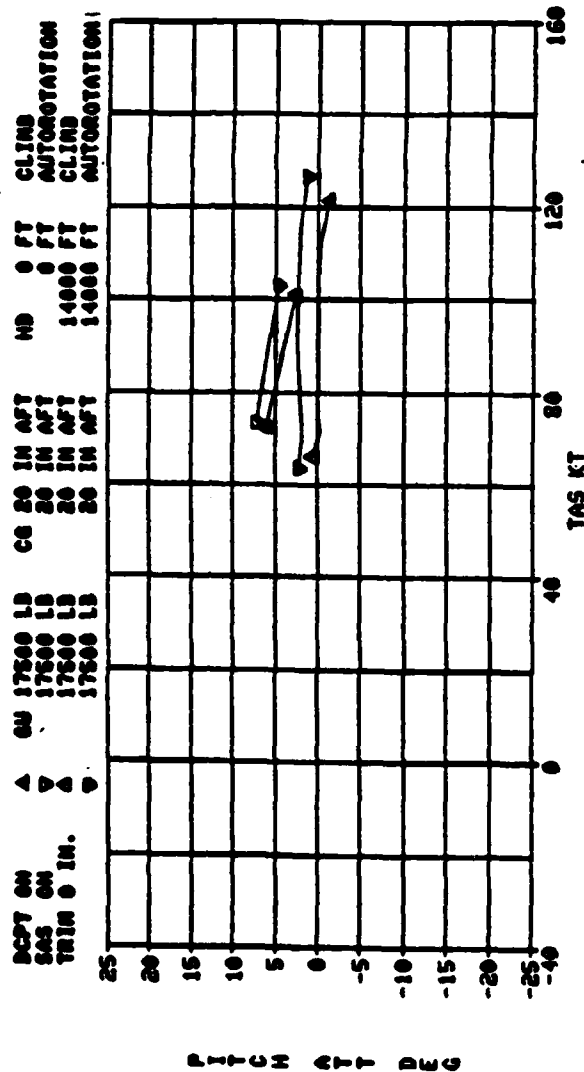


FIGURE 4C

# CH-46E TRIM CHARACTERISTICS SIDESLIP

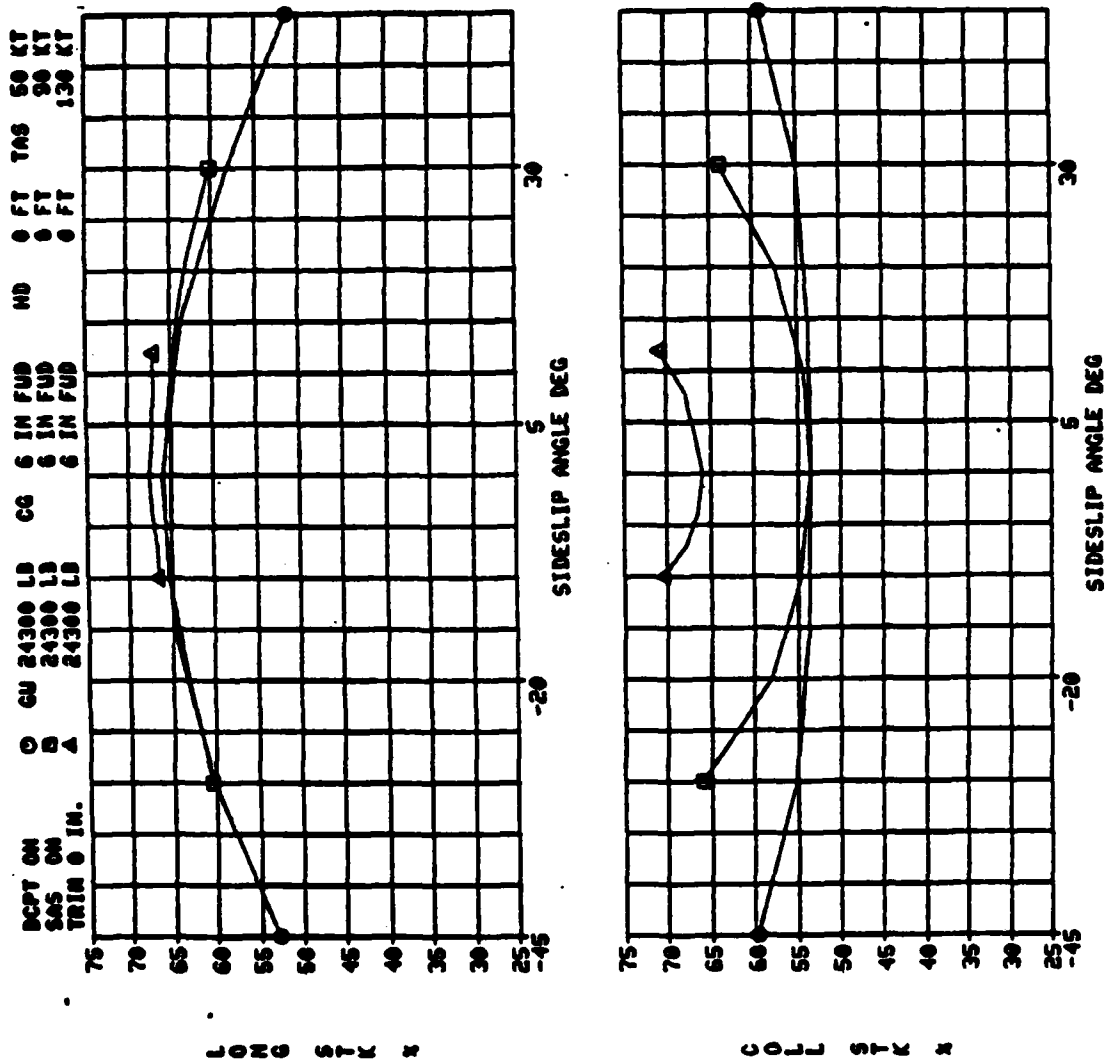
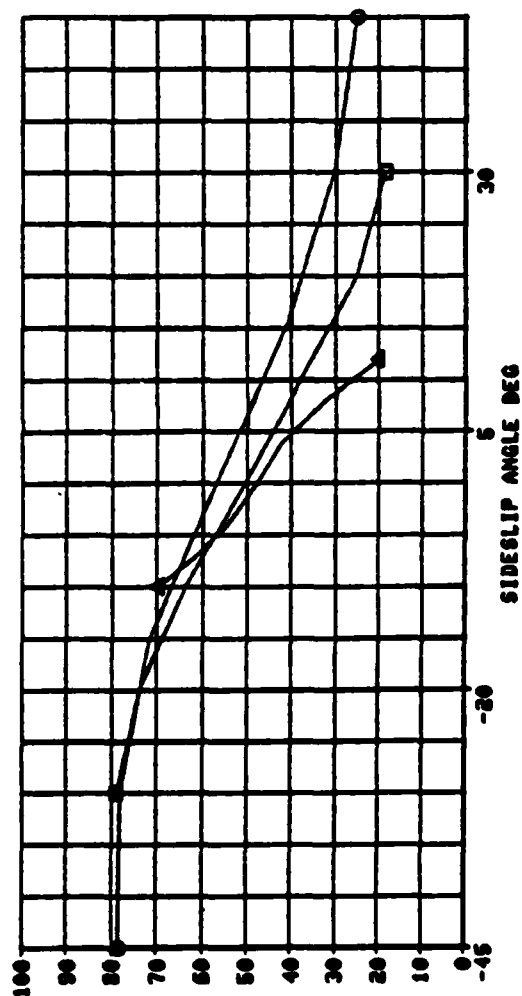
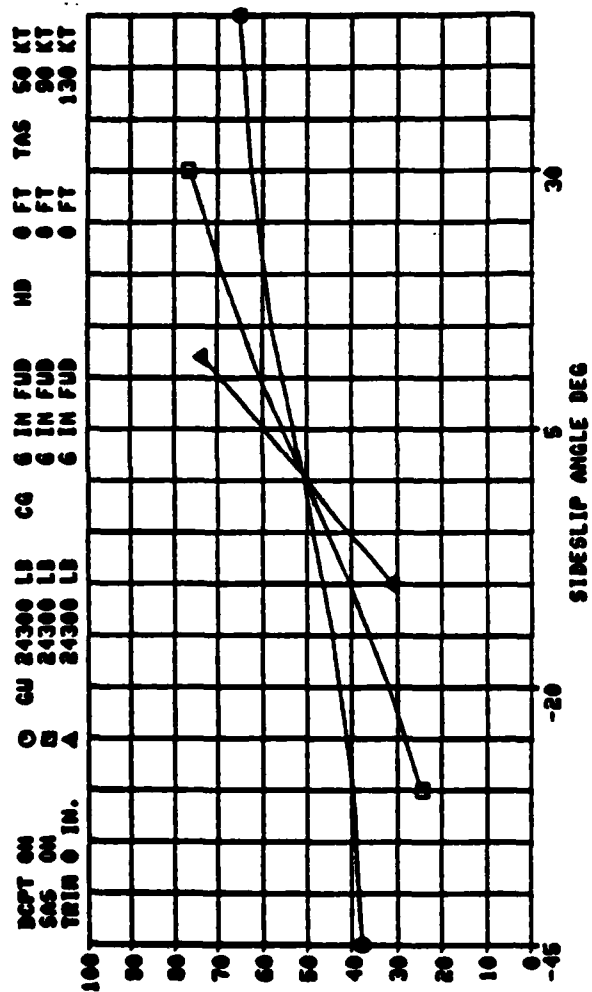


FIGURE 5A



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# CH-46E TRIM CHARACTERISTICS SIDESLIP

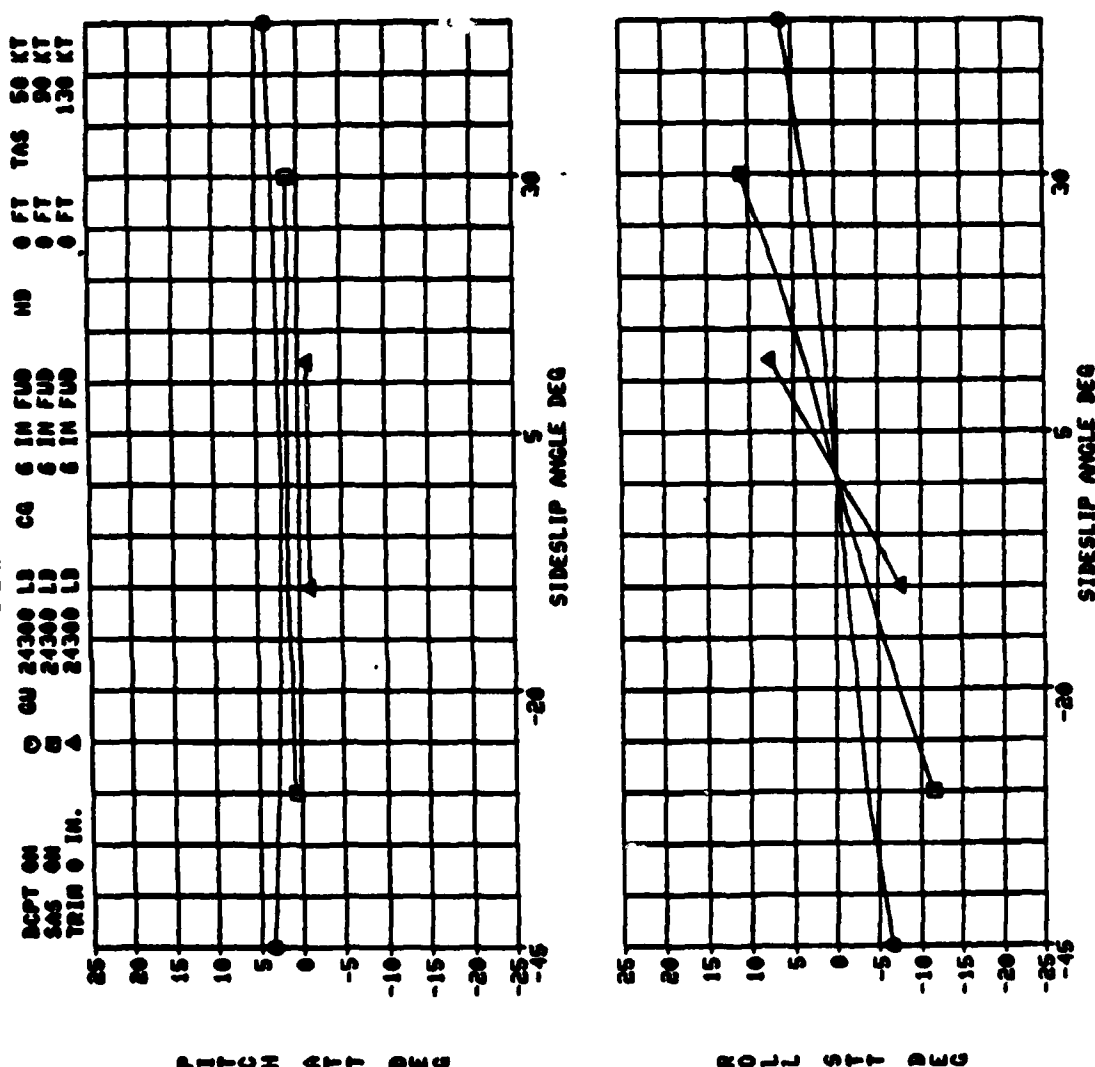


FIGURE 5C

# CH-46E TRIM CHARACTERISTICS SIDESLIP

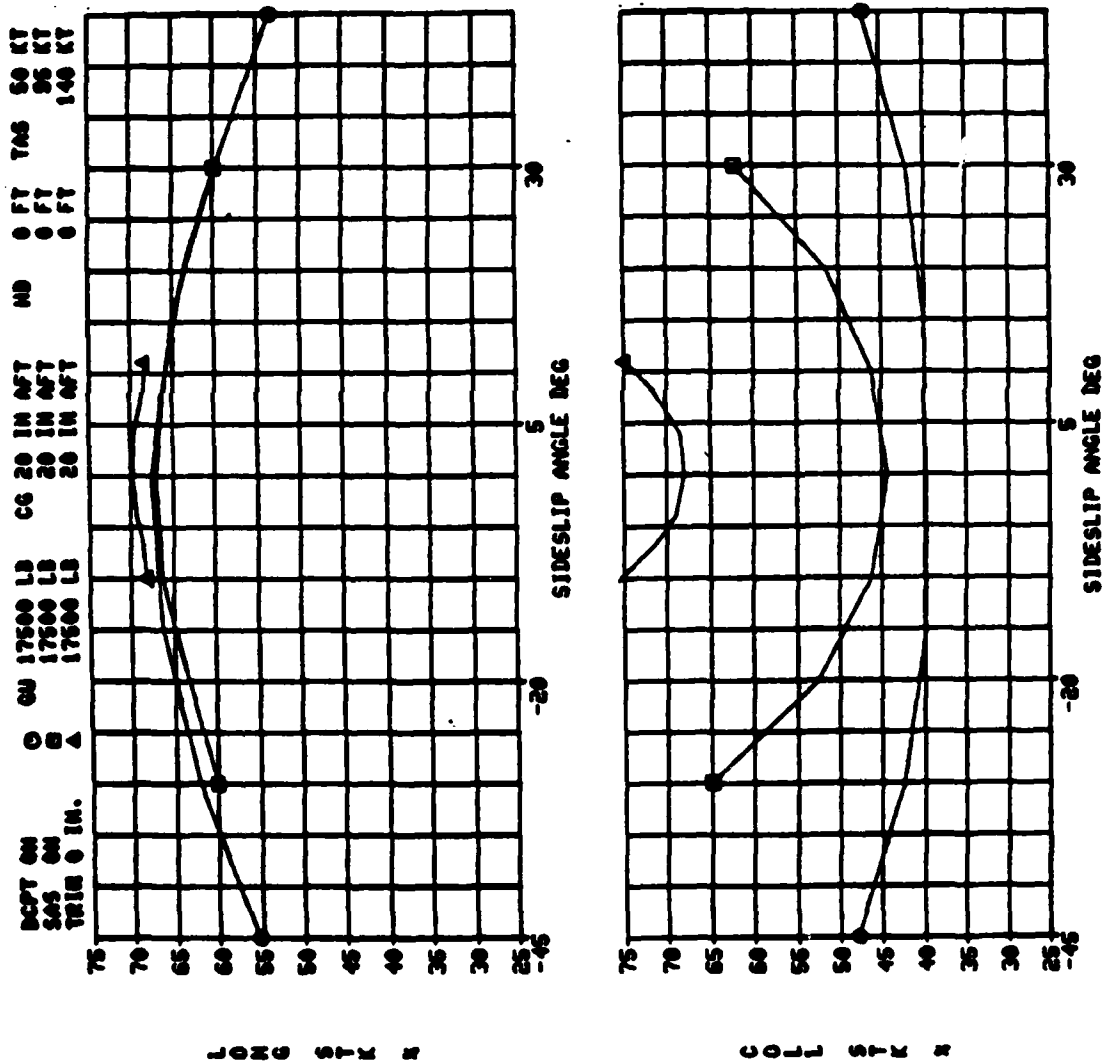


FIGURE 6A

# CH-46E TRIM CHARACTERISTICS SIDESLIP

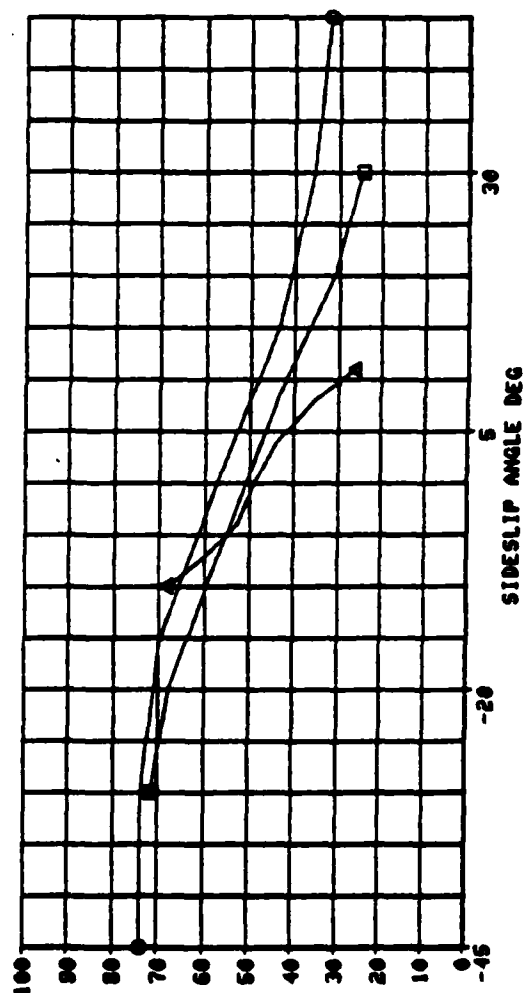
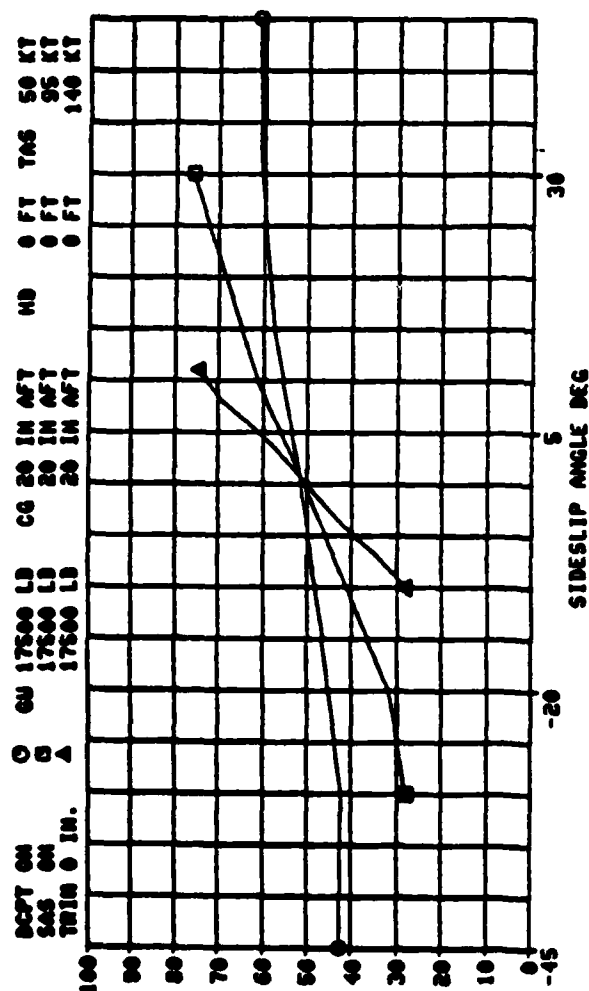


FIGURE 6B



# CH-46E TRIM CHARACTERISTICS SIDESLIP

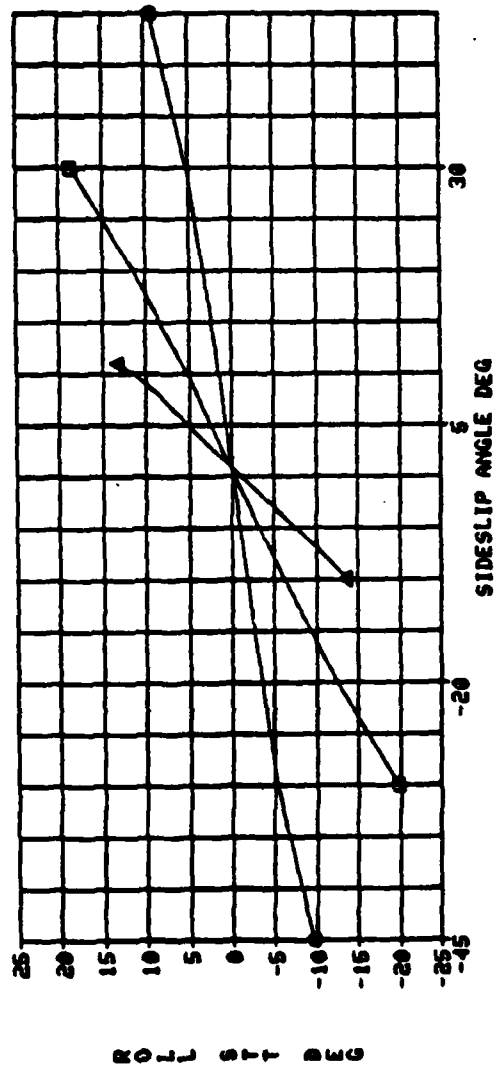
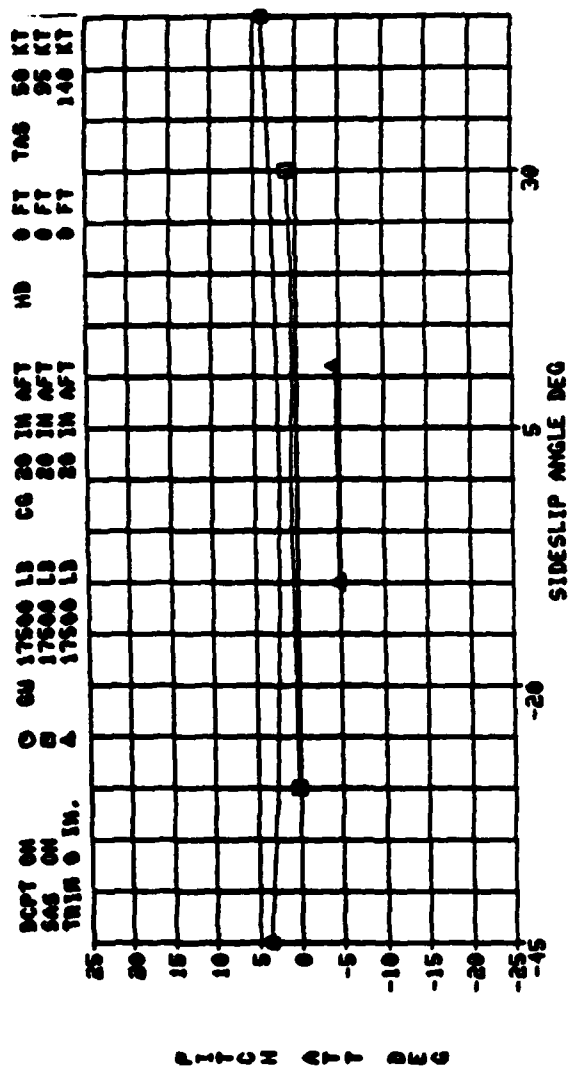


FIGURE 6C

# CH-46E TRIM CHARACTERISTICS SIDEWARD FLIGHT

DCPT ON    O    GW 24300 LB    CG 6 IN FWD    HD 0 FT  
SAS ON    O    17500 LB    20 IN AFT    0 FT  
TRIM 0 IN.

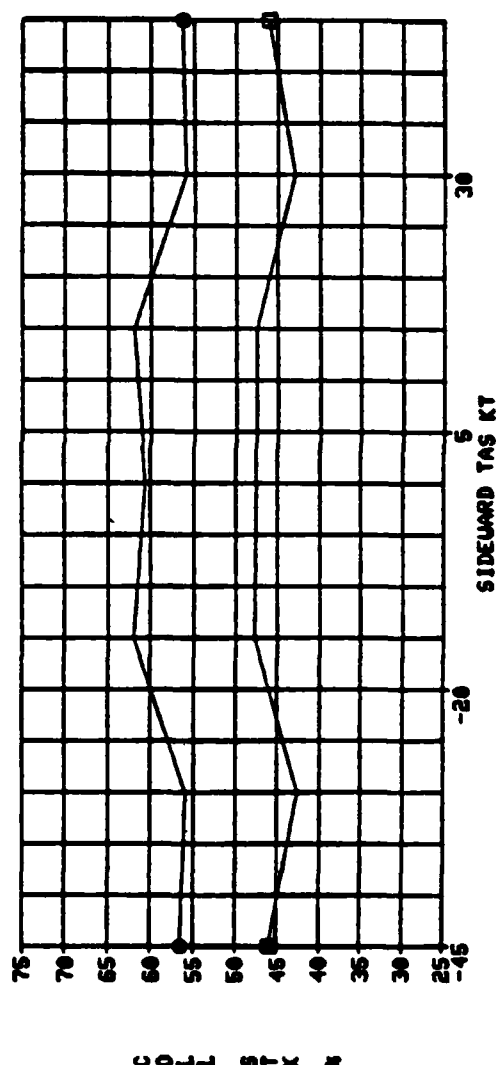
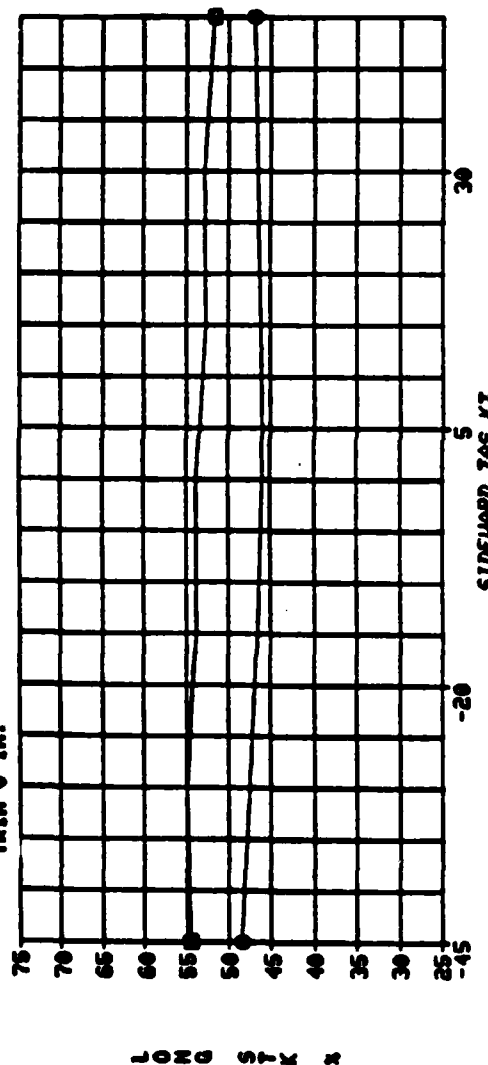


FIGURE 7A

# CH-46E TRIM CHARACTERISTICS SIDEWARD FLIGHT

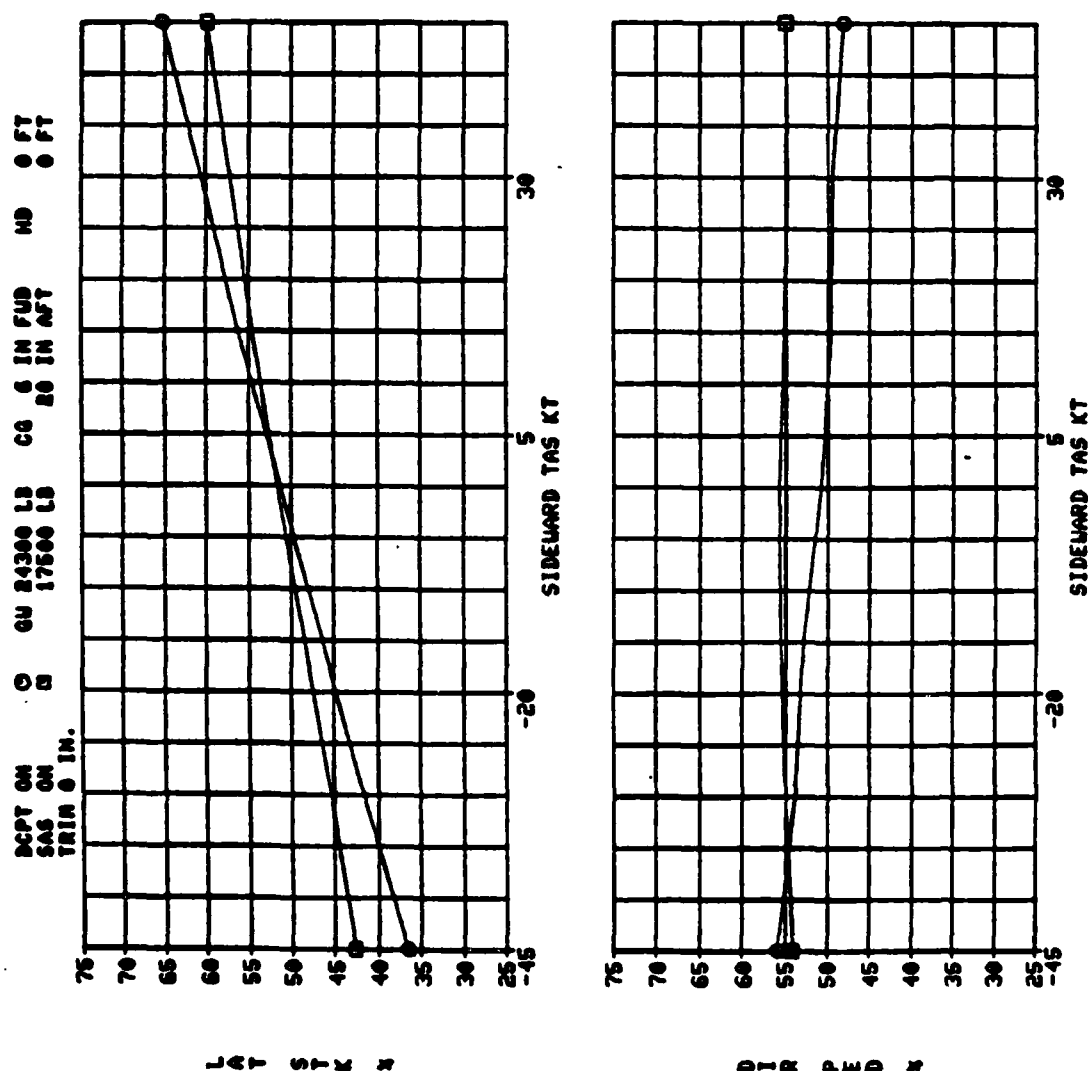


FIGURE 7B

# CH-46E TRIM CHARACTERISTICS SIDEWARD FLIGHT

BCPT ON  
SAS ON  
TRIM 0 IN.

0 GU 24300 LB CO 5 IN FWD MD 0 FT  
5 17500 LB 20 IN AFT 0 FT

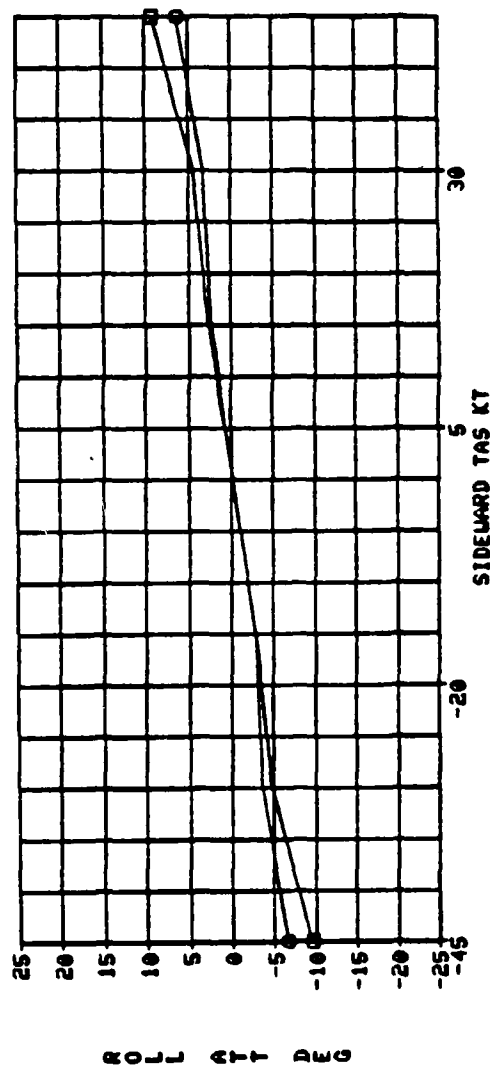
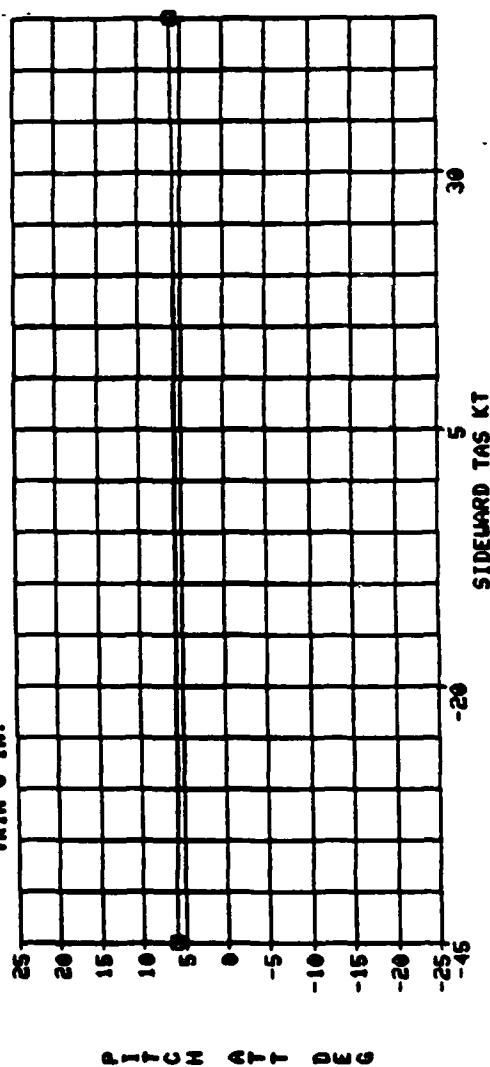


FIGURE 7C

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